OCEAN GALES AND STORMS, MARCH, 1930

Vessel	Voyage		Position at time of lowest barometer		Gale began	Time of lowest barometer	Gale ended	Lowest barometer	Direction of wind when gale began	Direction and force of wind at time of lowest barometer	Direction of wind when gale ended	Highest force of wind and direction	Shifts of wind near time of lowest barometer
	From—	To—	Latitude	Longitude									
NORTH PACIFIC OCEAN—continued			° ′	° ′				*Inches*					
Aden Maru, Jap. S. S.	Milke	Iloilo	29 33 N	128 10 E	Mar. 12	2 p, 12	Mar. 13	29.29	E	SW, —	W	SW, 10	SE-SW-W
Tacoma, Am. S. S.	Manila	San Francisco	42 15 N	135 20 W	do	10 p, 13	Mar. 16	29.97	NW	N, 9	NNE	N, 9	N-NNE
Benghalis, Du. S. S.	Borneo	Los Angeles	33 10 N	131 30 W	Mar. 13	2 p, 14	Mar. 15	29.80	NNW	NW, 9	NW	NW, 10	Steady
Makua, Am. S. S.	Hawaii	San Francisco	36 15 N	126 20 W	Mar. 14		Mar. 14	29.46	NW	NW, 9	N	NW, 9	Do.
Wisconsin, Am. S. S.	Portland	Shanghai	50 01 N	177 20 E	Mar. 7	2 p, 8	Mar. 9	29.46	W	WSW, —	NW	WSW, 11	WSW-NW
Do	do	do	49 44 N	176 00 E	Mar. 10	Noon, 10	Mar. 11	29.21	S	S, 8	WNW	SE, 11	S-SE-SW
Do	do	do	44 06 N	151 15 E	Mar. 14	8 p, 14	Mar. 15	29.63	ESE	ESE, 7	SE	ESE, 9	ESE-SE
California, Am. S. S.	Meridian 180°	San Francisco	45 10 N	175 26 W	Mar. 16	8 p, 16	Mar. 16	29.31	N	N, 8	SE	NW, 10	N-NNW.
Hakubasan Maru, Jap. M. S.	Yokohama	do	46 36 N	174 20 W	do	8 p, 17	Mar. 18	29.67	NNE	NE, 10	E	NE, 11	NNE-ENE
Emp. of Asia, Br. S. S.	do	Vancouver	49 32 N	164 17 E	Mar. 17	1 p, 19	Mar. 19	29.79	NE	NNE, 6	NE	NE, 10	Steady
Pres. Madison, Am. S. S.	do	Victoria	48 50 N	144 18 W	Mar. 16	4 a, 21	Mar. 22	29.24	N	W, 6	W	NE, 11	E-W
Ethan Allen, Am. S. S.	San Pedro	Kobe	32 45 N	140 50 E	Mar. 20	7 p, 20	Mar. 21	29.67	NNE	NNE, 6	NNE	NNE, 10	Steady
Nevada, Am. S. S.	Astoria	Yokohama	36° N	146° E	do	4 a, 21	Mar. 22	29.42	S	E, 10	NNW	NNW, 11	ESE-E-N
Tecumseh, Br. S. S.	Yokohama	San Pedro	38 43 N	153 30 E	Mar. 21	7 p, 21	Mar. 21	29.25	SE	SSE, 11	SW	SSE, 11	SE-SSE
Hakonesan Maru, Jap. M. S.	Vancouver	Yokohama	42 00 N	149 20 E	Mar. 20	3 a, 22	Mar. 24	28.92	SE	ESE, 4	NW	NW, 12	ESE-NW
Pres. Pierce, Am. S. S.	Yokohama	San Francisco	29 44 N	178 15 W	Mar. 23	6 p, 24	do	29.56	SW	WNW, 9	WNW	WNW, 9	2 pts.
Steelmaker, Am. S. S.	Honolulu	Yokohama	28 34 N	157 33 E	Mar. 26	6 a, 26	Mar. 28	29.62	SE	SE, 8	NNE	NNE, 9	
Do	do	do	32 15 N	146 01 E	Mar. 29	2 a, 29	Mar. 30	30.15	SSE	S, 8	SSW	SSW, 10	W-NW
Northwestern, Am. S. S.	Seward	Seattle	60 35 N	146 15 W	Mar. 31	8 a, 31	Mar. 31	29.28	SW	—, 6	SE	SW, 9	NE-SW

• Approximate.

NORTH PACIFIC OCEAN

By WILLIS E. HURD

Following upon the abnormal conditions of mean monthly atmospheric pressure which prevailed over some eastern parts of the North Pacific Ocean during the past January and February, the pressure of March settled more nearly into average. The Aleutian cyclone, while it spread on several days over a large area in the central Pacific, at times extending into the Tropics, was central over the upper western waters of the Gulf of Alaska, the minimum station average being 29.71 inches, at Kodiak. The mean pressures over the eastern part of the Bering Sea were raised considerably by the passage of an anticyclone of great magnitude during the 16th to 20th. The HIGH crested at Dutch Harbor and St. Paul on the 17th, giving maxima of 30.78 and 31.06 inches, respectively, which extreme readings appear to be the record high for March at these stations, and near record at Dutch Harbor for all months, being exceeded only in January, 1916, and February, 1922.

The California-Pacific anticyclone attained a high state of development which persisted through the greater part of the month. A feature was its local intrusion upon the coast of Washington and vicinity, where monthly pressures above normal occurred, whereas farther north and south coastal averages were below the normal.

Much high pressure prevailed on the Asiatic coast and over adjacent waters, resulting in some activity of the northeast monsoon. Its regularity, however, was considerably broken by several disturbances in low latitudes, one of which became a typhoon, and by several rather deep depressions which entered or formed over upper waters.

Barometric data for several island and coast stations in west longitudes, including Point Barrow on the Arctic Ocean, are given in the following table:

TABLE 1.—*Averages, departures, and extremes of atmospheric pressure at sea level at indicated hours, North Pacific Ocean and adjacent waters, March, 1930*

Stations	Average pressure	Departure from normal	Highest	Date	Lowest	Date
	Inches	*Inch*	*Inches*		*Inches*	
Point Barrow [1]	30.06		30.74	17th	29.22	1st.
Dutch Harbor [1]	29.85	+0.11	30.78	17th	29.20	26th.
St. Paul [1]	29.86	+0.11	31.06	17th	29.16	4th.
Kodiak [1]	29.71	−0.04	30.52	18th	28.86	5th.[2]
Midway Island [1]	30.07	−0.01	30.42	30th	29.56	23d.
Honolulu [3]	30.02	−0.02	30.16	4th	29.84	23d.
Juneau [3]	29.80	−0.14	30.70	29th	29.25	7th.
Tatoosh Island [3 4]	30.07	+0.09	30.43	26th	29.58	21st.
San Francisco [3 4]	29.98	−0.07	30.34	22d	29.37	14th.
San Diego [3 4]	29.97	−0.05	30.20	21st	29.61	14th.

[1] P. m. observations only.
[2] And on other date.
[3] A. m. and p. m. observations.
[4] Corrected to 24-hour mean.

The month may properly be called a stormy one on the North Pacific, since the vessel record, incomplete though it doubtless is at the present writing, shows eight days on which full storm to hurricane velocities occurred, in addition to several other days with whole gales. On the whole, however, storm conditions were less pronounced and widespread than in February, and much less so than in January, while they were only slightly more severe than in November and December of last year. For the entire period of five months it may safely be said there was an unusual succession of stormy weather. The higher

wind forces of March were encountered on the 2d, 3d, 8th, 10th, 17th, 18th, 21st, and 22d, with strong probabilities of their occurrence on one or more other dates.

On the 2d hurricane velocities were recorded in 32°–33° north latitude, 165° east longitude, in connection with what was apparently a fairly deep but short-lived cyclone. On the 3d, 17th, and 18th winds of force 11 occurred immediately south of the central Aleutians, and of lesser force over a considerably larger area. On the 8th and 10th the heavy gales were apparently confined to the western Aleutians.

The storm to hurricane velocities which were reported for the 21st and 22d are credited to the only typhoon of the month. This tropical cyclone originated, according to current information, southeast of Taiwan on the 19th. It moved northeastward, skirting the southern Japanese coast on the Pacific side, where it caused whole gales on the 20th, and when east of Hondo became intense, developing hurricane velocities on the two following days which persisted until the storm was east of Yezo, when it began losing vigor. On the 24th, when south of Kamchatka, it turned eastward, then again northeastward toward the Aleutian Islands, where it seems to have become identified with the semipermanent LOW of that region. Crossing the islands on the 27th, it moved northward as a shallow depression, and lost identity on the 28th south of Nome.

In addition to the severer gales mentioned as occurring south of the Aleutians, lesser gales, fresh to whole, were experienced along the northern routes across this region from the 1st to the 16th. In the Eastern and Japan Seas moderately severe gales occurred on the 12th and 13th, associated with a rather deep depression which originated in the upper part of the China Sea on the 11th and moved northward gaining intensity for two days, then practically dispersing in the Japan Sea on the 14th.

In the neighborhood of Midway Island fresh to strong gales were experienced by vessels on the 20th to 27th in connection with a disturbance which developed in the lower region of a trough of low pressure which extended from Alaska to the tropics. After reaching its fullest development north of Midway on the 23d, on which date pressure at the island dropped to 29.56 inches, the disturbance slowly withdrew to upper waters.

Between California and a region about midway thence to the Hawaiian Islands, two somewhat energetic cyclones occurred during the initial half of the month. The earlier, which began in February, caused fresh to whole gales from the 1st to the 4th of March midway along the routes, and on the 4th along the upper California coast. The second, which formed near San Francisco on the 13th, as the result of a westward extension of a cyclone central over Nevada, developed on the 14th and 15th off the coast, and caused moderate to whole gales at sea between the one hundred and twenty-fifth and one hundred and thirty-fifth meridians.

Fresh to strong gales occurred on several days in the upper part of the Gulf of Alaska, and on one day, the 24th, off Lower California.

Northers of force 8 blew in the Gulf of Tehuantepec on the 2d and 9th.

The prevailing wind direction at Honolulu was from the east, with a maximum velocity at the rate of 32 miles an hour from the same direction on the 2d. It was a more than ordinarily windy March at this station.

Fog, while comparatively infrequent, was more widely and uniformly distributed over the middle and upper ocean than it had been for several months, now appearing on about 5 to 10 per cent of the days in upper east longitudes, where it had been practically absent since the preceding autumn. Fog occurred on one to five days in west longitudes nearly along the fiftieth parallel, and on three to six days along the coast of the United States, where there was a marked decrease in its formation from that of February. On the night of the 25th–26th dense fog set in at the mouth of the Columbia River, where the French steamship *Arkansas* reported six ships in close proximity to each other lying at anchor waiting for it to clear.